

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 08 JUL 2005

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Applicant's or agent's file reference 63026A	FOR FURTHER ACTION	
International application No. PCT/US2004/009075	International filing date (day/month/year) 25.03.2004	Priority date (day/month/year) 27.03.2003
International Patent Classification (IPC) or national classification and IPC H01B1/20, H01B1/22, H01B1/24, C08L23/08, C08L23/10, C08L67/00, C08L69/00, C08K3/04, C08K3/00, C08K3/10, C08K7/06		
Applicant DOW GLOBAL TECHNOLOGIES INC. et al.		

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</li> <li><input checked="" type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</li> </ul> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>
<p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Box No. I Basis of the opinion</li> <li><input checked="" type="checkbox"/> Box No. II Priority</li> <li><input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and Industrial applicability</li> <li><input type="checkbox"/> Box No. IV Lack of unity of invention</li> <li><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li><input type="checkbox"/> Box No. VI Certain documents cited</li> <li><input type="checkbox"/> Box No. VII Certain defects in the international application</li> <li><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</li> </ul>

Date of submission of the demand 26.10.2004	Date of completion of this report 07.07.2005
Name and mailing address of the International preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Zeslawski, W Telephone No. +49 89 2399-7159



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**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
    - international search (under Rules 12.3 and 23.1(b))
    - publication of the international application (under Rule 12.4)
    - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

**Description, Pages**

1-14 as originally filed

**Claims, Numbers**

1-19 filed with telefax on 18.01.2005

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3.  The amendments have resulted in the cancellation of:
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):
4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

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## Box No. II Priority

1.  This report has been established as if no priority had been claimed due to the failure to furnish within the prescribed time limit the requested:
  - copy of the earlier application whose priority has been claimed (Rule 66.7(a)).
  - translation of the earlier application whose priority has been claimed (Rule 66.7(b)).
2.  This report has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rule 64.1). Thus for the purposes of this report, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

## Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:
  - the entire international application,
  - claims Nos. 1,14  
because:
    - the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):
    - the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 1,14 are so unclear that no meaningful opinion could be formed (specify):  
**see separate sheet**
    - the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
    - no international search report has been established for the said claims Nos. 1,14
    - the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

<b>the written form</b>	<input type="checkbox"/> has not been furnished
	<input type="checkbox"/> does not comply with the standard
<b>the computer readable form</b>	<input type="checkbox"/> has not been furnished
	<input type="checkbox"/> does not comply with the standard
    - the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.
    - See separate sheet for further details

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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**1. Statement**

Novelty (N)	Yes: Claims	
	No: Claims	2-13, 15-19
Inventive step (IS)	Yes: Claims	
	No: Claims	2-13, 15-19
Industrial applicability (IA)	Yes: Claims	2-13, 15-19
	No: Claims	

**2. Citations and explanations (Rule 70.7):**

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

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Reference is made to the following documents:

- D1: US-B-6 455 7711 (LEE WEI-KUO ET AL) 24 September 2002 (2002-09-24)
- D2: PATENT ABSTRACTS OF JAPAN vol. 2002, no. 10, 10 October 2002 (2002-10-10) & JP 2002 179854 A (DU PONT MITSUI POLYCHEM CO LTD), 26 June 2002 (2002-06-26)
- D3: US-B-6 274 0661 (EASTER MARK R) 14 August 2001 (2001-08-14)
- D4: EP-A-1 052 654 (UNION CARBIDE CHEM PLASTIC) 15 November 2000 (2000-11-15)
- D5: PATENT ABSTRACTS OF JAPAN vol. 2000, no. 23, 10 February 2001 (2001-02-10) & JP 2001 167634 A (NIPPON UNICAR CO LTD), 22 June 2001 (2001-06-22)
- D6: US 2002/032258 A1 (ISHIHARA KOJI ET AL) 14 March 2002 (2002-03-14)
- D7: EP-A-0 858 081 (MITSUBISHI CHEM CORP) 12 August 1998 (1998-08-12)

**Concerning Point V:**

**Novelty (Art.33(2) PCT)**

Document D1 discloses a semiconductive composition for use in power cable comprising a mixture of:

- 1) phase I material - a copolymer of ethylene and an unsaturated ester,
- 2) phase II material - (A) a non-polar copolymer of ethylene and alpha olefin , or (B) non-polar elastomer,
- 3) a conducting filler ( col.2 l.30 to col.3 l.45, col.6 l.57-60).

Furthermore, D1 discloses a process for preparing a semiconductive power cable (col.7 l.61 to col.9 l.22).

Therefore, the subject mater of claims 5-13, 15-17 is not novel.

Document D2 discloses a resin composition consists of components (A) , (B) and carbon black, a coupling agent and a curing agent, wherein: (A) is a copolymer of ethylene and an unsaturated ester and (B) is a saturated styrenic thermoplastic elastomer (examples). The said composition is used for power cables.

Therefore, the subject mater of claims 5-13, 15-17 is not novel.

Document D3 discloses a semiconductive composition comprising a base polymer, an adhesion modifying compound and a conductive carbon black (claim 1). Furthermore, the said composition is used as a shied layer in multi layer power cables (col.5 l.43 to col.6 l.24).

Therefore, the subject mater of claims 5-13, 15-19 is not novel.

Document D4 discloses a power cable having a semiconductive shield layer, which

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contains (a) polyethylene; polypropylene; or mixture thereof, (b) carbon nanotubes (claim 1). The component (a) can be crosslinked in a conventional manner with an organic peroxide (par.[0027]).

Therefore, the subject matter of claims 2-13 and 15-17 is not novel.

Document D5 discloses a chemically cross-linked polyethylene insulating power cable in which an inner semi-conductive layer, a chemically cross-linked polyethylene insulating layer, an outer semi-conductive layer and a jacket layer are formed on a conductor in sequence. In this power cable, the outer semi-conductive layer is formed from a peelable semi-conductive resin composition, which comprises (a) at least one selected from specific ethylene-vinyl acetate copolymers, ethylene-ethyl acrylate copolymers and ethylene-butyl acrylate copolymers, (b) an ethylene alpha-olefin copolymers, (c) polypropylenes, (d) organopolysiloxane, (e) carbon blacks, and (f) organic peroxides.

Therefore, the subject matter of claims 2-13 and 15-19 is not novel.

Document D6 discloses cable semiconductive shield composition comprising (a) and (b) ethylene copolymers, (c) polypropylene, (d) an organopolysiloxane, (e) carbon black and (f) organic peroxide (claim 1). Furthermore, D6 discloses an electric power cable, which comprises several layers including a first semiconductive shield layer, an insulating layer, a second semiconductive shield layer (par.[002] and [049]).

Therefore, the subject matter of claims 2-13 and 15-19 is not novel.

Document D7 discloses a power cable comprising semiconductive layer, which is made from a composition containing two different ethylene copolymers, a silane compound and carbon black (claims 17 and 2).

Therefore, the subject matter of claims 5-13, 15-17 is not novel.

**Inventive Step (Art.33(3) PCT)**

Since the subject matter of claims 2-13 and 15-19 is regarded as being not novel, the discussion of the inventive step appears to be pointless.

**Concerning Point VIII:**

The amendments filed with the letter dated 18.01.2005 introduce subject-matter which

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extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT and Article 19(1).

The amendments concerned are the following: In the claim 1 and 14 a new combination of feature has been introduced, i.e. features (ii) lines 7-9 of claim 1 and features (ii) lines 8-10 of claim 16.

The terms : "high-temperature polymer", and "soft polymer" have not clear meanings (Art. 6 PCT) and can refer to several type of polymers.

The features of claims 1 (i) and (ii) characterise a cable layer made from the composition comprising (a) and (b) not a composition per se. Furthermore, claims 1 and 14 attempt to define a "high-temperature polymer", and a "soft polymer" in terms of the result to be achieved, i.e. by introducing features (iii) and (iv). Such formulations is not allowable because it appears to be possible to define the subject-matter in more concrete terms, viz. in terms of how the effect is to be achieved.

## Replacement Page

- 1 1. A semiconductive power cable composition comprising:
  - 2 a. a mixture of a high-temperature polymer and a soft polymer; and
  - 3 b. a conductive filler,
- 4 wherein
  - 5 (i) a semiconductive cable layer prepared from the composition stripably
  - 6 adheres to a second cable layer,
  - 7 (ii) in the absence of a curing agent, the semiconductive cable layer having
  - 8 a heat resistance of less than 100% as measured by a Hot Creep test at
  - 9 a testing temperature of 150 degrees Centigrade,
  - 10 (iii) the high temperature polymer being a polymer suitable to impart heat
  - 11 resistance to the semiconductive cable layer, and
  - 12 (iv) the soft polymer being a polymer that enhances the processing
  - 13 characteristics of the high temperature polymer.
- 1 2. The semiconductive power cable composition of Claim 1 wherein the high-temperature polymer is selected from the group consisting of polypropylenes, polyesters, nylons, polysulfones, and polyaramides and the soft polymer is selected from the group consisting of polyethylenes, polypropylenes, polyesters, and rubbers.
- 1 3. The semiconductive power cable composition of Claim 2 wherein the high-temperature polymer is a polypropylene and the soft polymer is a polyethylene.
- 1 4. The semiconductive power cable composition of Claim 3 wherein the polyethylene is a copolymer of a polar monomer and a nonpolar monomer.
- 1 5. The semiconductive power cable composition of Claim 1 wherein the conductive filler is selected from the group consisting of carbon blacks, carbon fibers, carbon nanotubes, graphite particles, metals, and metal-coated particles.
- 1 6. The semiconductive power cable composition of Claim 1 wherein the second cable layer being chemically-crosslinked.
- 1 7. The semiconductive power cable composition of Claim 1, further comprising a curing agent.
- 1 8. The semiconductive power cable composition of Claim 1 further comprising a coupling agent.
- 1 9. The semiconductive power cable composition of Claim 8 wherein the coupling agent reduces the amount of a curing agent required to impart heat resistance to the semiconductive cable layer.

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1 10. The semiconductive power cable composition of Claim 9 further comprising a  
2 curing agent.

1 11. The semiconductive power cable composition of Claim 1 wherein the mixture  
2 further comprises a compatibilizing polymer.

1 12. A semiconductive cable layer prepared from the semiconductive power cable  
2 composition of Claim 1.

1 13. A power cable construction prepared by applying the semiconductive cable  
2 layer of Claim 12 over a wire or cable.

1 14. A process for preparing a semiconductive power cable composition  
2 comprising the step of:

3 blending a mixture of a high-temperature polymer, a soft polymer, and a  
4 conductive filler,

5 wherein

6 (i) a semiconductive cable layer prepared from the composition strippably  
7 adheres to a second cable layer,

8 (ii) in the absence of a curing agent, the semiconductive cable layer having  
9 a heat resistance of less than 100% as measured by a Hot Creep test at  
10 a testing temperature of 150 degrees Centigrade,

11 (iii) the high temperature polymer being a polymer suitable to impart heat  
12 resistance to the semiconductive cable layer, and

13 (iv) the soft polymer being a polymer that enhances the processing  
14 characteristics of the high temperature polymer.

1 15. The process of Claim 14, wherein the mixture further comprises a coupling  
2 agent.

1 16. A process for preparing a semiconductive power cable composition  
2 comprising the steps of:

3 a. reactively-coupling a mixture of a high-temperature polymer, a soft  
4 polymer, and a coupling agent, in the presence of a conductive filler, wherein  
5 the coupling agent reduces the amount of a curing agent required to impart  
6 heat resistance to a semiconductive cable layer prepared from a mixture of the  
7 high-temperature polymer, the soft polymer, and the conductive filler in the  
8 absence of the coupling agent; and

9 b. admixing a curing agent,

## Replacement Page

10 Wherein a semiconductive cable layer prepared from the composition strippedly  
11 adheres to a second cable layer.

1 17. A process for preparing a power cable comprising the steps of:

2 a. extruding a semiconductive power cable composition comprising a  
3 mixture of a high-temperature polymer, a soft polymer, and a conductive filler,  
4 over a metallic conductor to yield a semiconductive cable layer over the  
5 metallic conductor; and

6 b. extruding a polymer-dielectric insulation over the semiconductive  
7 cable layer.

1 18. The process for preparing a power cable of Claim 17 further comprising the  
2 step of

3 c. extruding a second semiconductive power cable composition over the  
4 polymer-dielectric insulation to yield a second semiconductive cable layer.

1 19. A process for preparing a power cable comprising the steps of:

2 a. extruding a power cable semiconductive composition comprising a  
3 mixture of a high-temperature polymer, a soft polymer, and a conductive filler,  
4 over a metallic conductor to yield a semiconductive cable layer over the  
5 metallic conductor;

6 b. extruding a chemically-crosslinkable insulation composition over the  
7 semiconductive cable layer;

8 c. extruding a second semiconductive power cable composition over the  
9 polymer-dielectric insulation to yield a second semiconductive cable layer;  
10 and

11 d. crosslinking the chemically-crosslinkable insulation composition to  
12 yield a crosslinked, polymer-dielectric insulation.